

## PATENT COOPERATION TREATY

PCT

NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

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Date of mailing (day/month/year) 11 October 2001 (11.10.01)		
Applicant's or agent's file reference P3087		IMPORTANT NOTICE
International application No. PCT/GB01/01515	International filing date (day/month/year) 04 April 2001 (04.04.01)	
		Priority date (day/month/year) 05 April 2000 (05.04.00)
Applicant HUNTLEIGH TECHNOLOGY PLC et al		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

KP, KR, US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EE, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OA, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ,

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 11 October 2001 (11.10.01) under No. WO 01/74287

**REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)**

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

**REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))**

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

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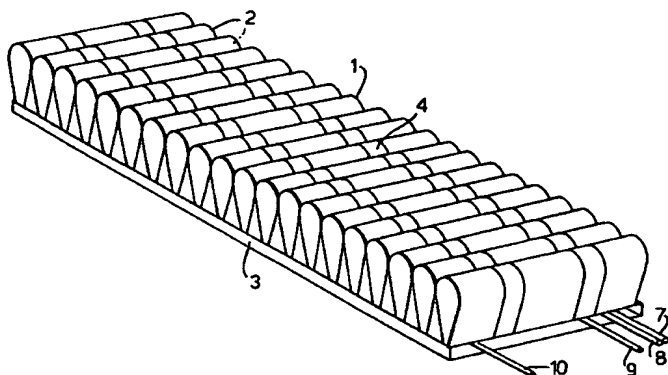
(74) Agent: **THAKER, Shalini**; Group IPR Department, Huntleigh Technology PLC, 310-312 Dallow Road, Luton, Bedfordshire LU1 1TD (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

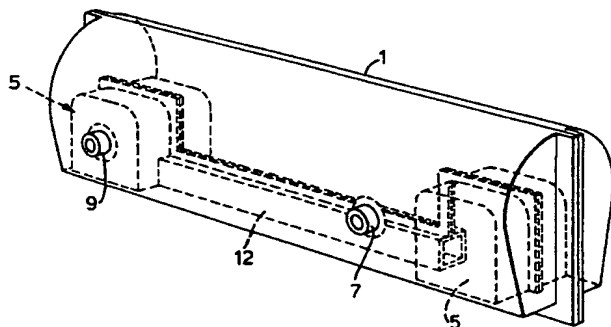
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

[Continued on next page]

(54) Title: INFLATABLE SUPPORT



(57) Abstract: An alternating pad consisting of transverse inflatable cells (1 and 2) (not show) alternately inflated and deflated. An internal cell (5) is provided at the outermost edges of each transverse cell (1, 2). The internal cell (5) is constantly inflated at a higher pressure than the transverse cells (1, 2). The internal cell (5) is at a lower height than the cells (1, 2) and preferably of a chamfered shape to provide optimum pressure relief across the whole surface of the pad. The internal cell (5) provides stable patient exit, entry or transfer from a bed or seat.



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patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,  
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments*

**Published:**

— *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

### INFLATABLE SUPPORT

The invention relates generally to an inflatable support and more particularly to a pressure pad, alternating pad, or cushion for the prevention of  
5 decubitous ulcers.

In recent years, inflatable supports have come into extensive use and are used widely in hospitals to prevent and treat decubitus ulcers which are commonly referred to  
10 as bed sores. A primary cause of bed sores is the inability of the patient to move so as to relieve pressure points. These pressure points typically occur in the area of a bony protuberance which results in a cut-off of the blood flow in the skin and soft tissue  
15 adjacent to the protuberance when distortion of capillary beds curtails blood flow. When the blood flow in the capillaries is blocked due to excessive external interface pressure, the cells in that area begin to die and may result in a wound which is called a bed sore.  
20 Mobile persons do not have this problem because they continually move even when asleep which eliminates the cut-off of blood flow for too long a period.

A typical inflatable support system for the prevention of bed sores has a plurality of parallel cells  
25 alternately inflated to provide support for the user.

The inflatable support system may comprise an alternating pad or mattress for a bed or similar system for a seat.

It has been found that with such inflatable support  
30 systems that users are at risk of falling, particularly when getting onto and off from the bed or seat.

In order to provide easier user entry, exit or transfer and prevent the user falling out with such an inflatable support, it is known to have two inflatable side chambers extending lengthwise of the support and  
5 each connected to receive air under pressure from a source. The source also supplies air under pressure to a plurality of side-by-side alternately inflated air tubes extending laterally of the mattress and between the two side chambers, the arrangement being such that, when  
10 inflated, the upper surface of each side chamber lies at or above the upper surface of the air tubes.

However, the above arrangement provides for increased interface pressure at the surface of the side chambers and has resulted in pressure sores occurring on  
15 the user at the elbows and heels. Also, the side chambers increase the height of the support making it difficult for some users to physically get onto the support.

The present invention provides an improved  
20 inflatable support having stable user entry, exit or transfer from a bed or seat but also providing improved pressure relief over the whole surface area of the support.

According to the invention, an inflatable support  
25 for providing pressure relief, comprising at least one inflatable cell extending transversely of the support, the one or more transverse cell(s) having within each of their outermost opposite ends, internal cells at a higher pressure than the transverse cell(s), the internal cells  
30 having a lower height than the transverse cells, such that the whole of the support surface provides pressure relief. By arranging for the height of the internal cell

to be smaller than the transverse cell, the pressure relief is not compromised by ensuring that the area enjoying pressure relief is the whole surface of the support. Further, the internal cells provide improved  
5 stability of the support edge, so that a user is prevented from falling out and has a firmer edge for entry, exit and transfer.

Preferably, there are provided a plurality of transverse cells inflated and deflated alternately.

10 More preferably, the internal cells are constantly inflated. To provide a better comfort for the user lying thereon and better pressure relief, the internal cells are chamfered at their internal edges. More preferably, the internal cells are filled with foam or similar  
15 material.

Preferably, the internal cells at each opposite end of the transverse cell are connected by a common manifold and inflated jointly by that manifold. Additionally, the manifold is of foam.

20 The invention will now be described by way of example only with reference to the accompanying figures in which:-

Figure 1 is a schematic view of a pressure pad according to the invention;

25 Figure 2 is a cross-sectional representation of the pressure pad showing the internal cells; and

Figure 3 is a cross-sectional representation of the pressure pad showing the internal cells and common manifold;

30

Referring to Figure 1, a first set of inflatable cells 1 and a second set of inflatable cells 2 are shown,

the first set being fully inflated and the second set fully deflated. The two sets are alternately inflatable and are supplied with air from a compressor (not shown). The first and second sets are supplied air from  
5 respective feed lines 7 and 8.

There is provided a base sheet 3 of plastics material to which may be attached restraining straps 4 of plastics material, each cell being retained in position by at least one such strap 4. Adjacent straps are  
10 attached to one another by welds. As shown in Figures 2 and 3, an internal cell 5 is attached between the sides of each cell 1 or 2 at opposite ends.

The transverse cells 1, 2 are generally tubular and of approximately constant cross-section, with height  
15 greater than width on full inflation. The internal cells 5 are positioned at about  $2/3$  of the height of the inflated cell 1, 2 so that the upper region of the transverse cell 1, 2 over the internal cells 5 provides pressure relief when inflated. The cross sectional shape  
20 of each internal inflated cell is preferably a rectangle with a chamfered internal upper edge. By arranging for the height of the internal cell 5 to be smaller than the transverse cell, the pressure relief is not compromised whilst also providing improved stability at the support  
25 edges. In addition, the chamfered inner edge provides a better comfortable position for the user and ensures that the area enjoying pressure relief is the whole surface of the support. The quasi-rectangular shape of each internal cell 5 is also very much more rigid than the  
30 transverse cells 1, 2.

Each transverse cell 1, 2 is made from a rectangular sheet approximately 51 cm x 89 cm. A rectangular

membrane measuring approximately 3.1 cm to 5 cm x 86 cm is radio frequency welded to one side of the sheet so that when the sheet is folded in half along the shorter side, and welded together along the three pairs of edges, internal cells 5 having a height at about 70% of the height of the transverse cell 1, 2 are welded to the two ends.

An aperture for the passage of air from the respective feed line may be formed in each internal cell 5 and on the transverse cell 1, 2 side end.

In the preferred embodiment, the internal cells 5 are supplied with fluid by manifolds 9, 10 which run along the side of the transverse cells 1, 2. Two such manifolds are shown in Figure 2, one manifold feeding each set of cells 1,2 and opposite internal cells 5. As shown in Figure 3, an additional manifold 12 may be located between each internal cell 5 reducing the number of feeds to the internal cells 5. The internal cells 5 may be filled with foam rather than air to provide a firm outer edge for each transverse cell 1, 2. The two 'foam' internal cells 5 may also be interconnected with foam to prevent the patient from bottoming in the event of power failure or transportation.

The transverse cells 1,2 may be inflated alternately or constantly to provide an alternating or static support surface. The top surface of the transverse cells 1,2 may be perforated to provide a low air loss pad or mattress or seat.



**CLAIMS:**

1. An inflatable support for providing pressure relief, comprising at least one inflatable cell extending transversely of the support, the one or more transverse cell(s) having within each of their outermost opposite ends, internal cells at a higher pressure than the transverse cell(s), the internal cells having a lower height than the transverse cells, such that the whole of the support surface provides pressure relief.

2. An inflatable support as claimed in claim 1, wherein there are provided a plurality of transverse cells, inflated and deflated alternately.

15

3. An inflatable support as claimed in claims 1 or 2 wherein the internal cell(s) are constantly inflated.

4. An inflatable support as claimed in claims 1, 2 or 3 wherein the internal cell(s) are chamfered at their internal edges.

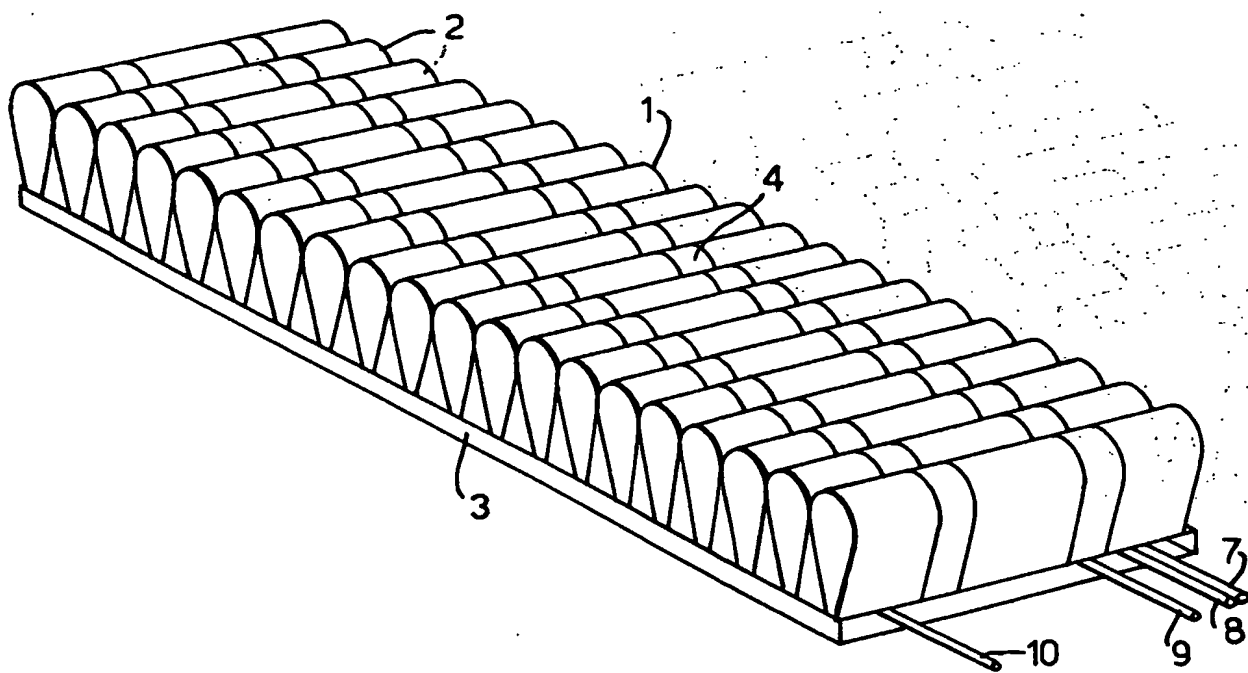
5. An inflatable support as claimed in claims 1 to 4 wherein the internal cell(s) are filled with foam or similar material.

6. An inflatable support as claimed in claims 1 to 5 wherein the internal cell(s) at each opposite end of the transverse cell are connected by a common manifold and inflated jointly by that manifold.

7. An inflatable support as claimed in claim 6 wherein the manifold is of foam.

1/2

Fig.1.



2/2

Fig.2.

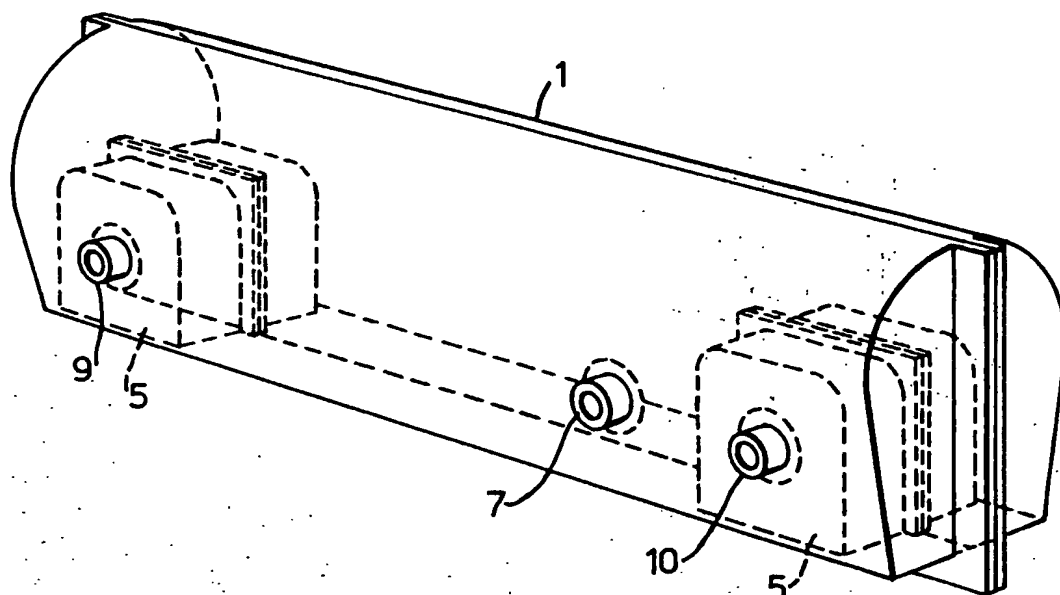
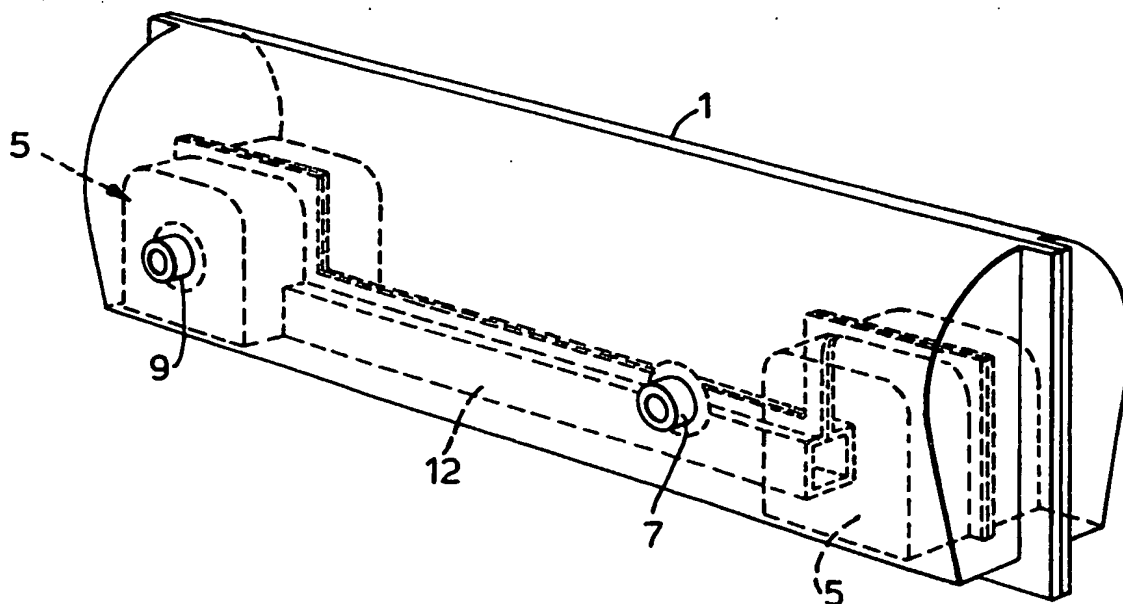


Fig.3.



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/01515

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A61G7/057

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61G A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 774 917 A (LIU ANTONY CHING-FONG) 7 July 1998 (1998-07-07)	1, 3, 4
Y	the whole document	2
Y	WO 97 17869 A (LINLEY PETER W) 22 May 1997 (1997-05-22) the whole document	2
A	US 5 765 246 A (SHOENHAIR JOHN J) 16 June 1998 (1998-06-16) abstract; figures	1, 5
A	GB 2 267 217 A (CALDWELL KENNETH ; CALDWELL VERA (GB)) 1 December 1993 (1993-12-01) page 11, line 4 - line 12; figure 11	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
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- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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\*&\* document member of the same patent family

Date of the actual completion of the international search

2 August 2001

Date of mailing of the international search report

09/08/2001

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 01/01515

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5774917	A	07-07-1998	NONE		
WO 9717869	A	22-05-1997	US	5662384 A	02-09-1997
			AU	714208 B	23-12-1999
			AU	7679696 A	05-06-1997
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			EP	0643572 A	22-03-1995
			WO	9324088 A	09-12-1993

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>P3087</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, Item 5 below.	
International application No. <b>PCT/GB 01/ 01515</b>	International filing date (day/month/year) <b>04/04/2001</b>	(Earliest) Priority Date (day/month/year) <b>05/04/2000</b>
Applicant <b>HUNTLEIGH TECHNOLOGY PLC et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

### 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

1, 3



None of the figures.

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International Application No

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- \*G\* document member of the same patent family

Date of the actual completion of the international search

2 August 2001

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09/08/2001

Name and mailing address of the ISA

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 Fax: (+31-70) 340-3016

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Godot, T



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/01515

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5774917	A	07-07-1998	NONE	
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US 5765246	A	16-06-1998	US 5642546 A AU 7162396 A CA 2232657 A WO 9710737 A	01-07-1997 09-04-1997 27-03-1997 27-03-1997
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